

REMARKS

Reconsideration of the application is requested in view of the amendments above, comments which follow, and attachments hereto. The following discussion uses the same numbering as appears in the Office Action.

Supporting Arguments for US Patent Application No. 10/559,582

The issues raised in the outstanding office action are discussed below using the same numbering as appears in the action.

Specification

3. The external part of shaft 27 is now labelled 41 in Figure 4 and reference thereto has been included in the specification.

Reference numeral 39 has been removed from Figure 3 and is now employed in Figure 4 to identify the "inner end" of the external part 41 of the shaft 27.

Drawings

4. As required, Figures 1(a)-2 have been designated as prior art.

5. The references to the "spindle body 36" in the specification have been corrected to refer to the "spindle housing 36" to address the anomaly identified by the examiner.

6. The stator is shown in Figure 5. It is now labelled by numeral 50 in Figure 5. It is already identified by numeral 50 in the specification.

The external part and the inner end of the shaft 27 are now labelled with numerals 41 and 39, respectively in Figure 4.

Rejections under 35 U.S.C. §112

8. Claim 2 has been amended as suggested by the examiner.

9. Claim 2 has been amended to clarify which part of the shaft is being referred to as "external". The term "inboard" has been amended to "inner" to further clarify which

end is being referred to. It is submitted that these features are now clearly defined in claim 2 without the need for further antecedent basis.

10. The motor rotor and stator are now recited in claims 2 and 3, with the amendment of claim 2 providing antecedent basis for the reference to the rotor in claim 4.

Rejections under 35 U.S.C. §103

12. In the office action, the Examiner has rejected the claims under 35 U.S.C. §103(a), and asserts that it would have been obvious at the time of the invention to modify the motor housing of Pflager (US 5443413) to include hydrostatic bearings on opposite sides of the motor in view of Suzuki (JP 411013759) in order to provide a spindle that has an improved dynamic stiffness and a higher rotational accuracy. However, applicants submit that this was not an obvious step to take at the time of the invention.

Prior to the present invention, as exemplified by the cited prior art, it was known to provide two bearings on one side of the motor, or one bearing on each side of the motor. However, designing a spindle with three bearings had not previously been pursued due to the belief that over-constraint of the shaft will occur, leading to bearing overload should misalignment be present, and in practice it always is to some extent.

The present inventors realized that introducing a greater degree of shaft bending compliance would allow for the imperfections in alignment that would cause the problems mentioned above. Furthermore, they appreciated that, in combination with the claimed three bearing arrangement, an overall stiffer long spindle can still be achieved despite the increased bending compliance, due to the additional support afforded by the three bearings.

Without three bearings in place, the first resonant bending frequency of a relatively long spindle for grinding re-entrant cams would limit the spindle speed to an unacceptably low value. The present configuration solves this problem.

Thus, it can be seen that the steps to the three bearing configuration defined in claim 1 were not straightforward or obvious modifications to make. Combination of the

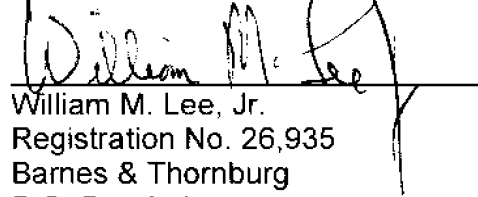
two cited references would not have been considered by a person of ordinary skill in this field without the benefit of hindsight, due to the prejudice against it described above.

Therefore, in view of the above, it is submitted that the claims distinguish from the prior art, and are allowable thereover. The Examiner's further and favorable reconsideration in that regard is urged.

As this Response is being sent during the fourth month following the Examiner's Office Action, an appropriate Petition for Extension of Time is also submitted herewith.

July 23, 2007

Respectfully submitted,

A handwritten signature in black ink, appearing to read "William M. Lee, Jr.", is written over a horizontal line. The signature is stylized and cursive.

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